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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/819,787	03/28/2001	Timothy Scott Chamberlin	0140/00281	6572

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EXAMINER

AHMED, SHAMIM

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 06/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/819,787

Applicant(s)

CHAMBERLIN ET AL.

Examiner

Shamim Ahmed

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 19-38 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 19-24, 26-27, 32-33 and 37-38 are rejected under 35 U.S.C. 102(b) as being anticipated by Wang et al (5,770,103).

As to claim 19, Wang et al disclose a method for polishing metal, wherein the metal substrate is contacted with a polishing pad and slurry is used to polish the metal including abrasive particles and an oxidizing agent such as potassium iodate (col.2, lines 17-22 and lines 32-41 and example 1).

Wang et al also disclose that abrasive particles may be comprised of any of the oxides such as alumina, silica, ceria and zirconia at about 0.01 % to about 15 % by weight (col.2, line 23-31).

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Wang et al further disclose that the pH of the slurry is maintain at about 1 to about 7 (col.3, lines 8-12).

Wang et al inherently teach that the property of the oxidizing agent such as the static etch rate on metal is less than 1000 Angstrom per hour because the oxidizing agent (potassium iodate) used by Wang et al is exactly same with the applicant's oxidizing agent.

As to claim 20, Wang et al teach that the oxidizing agent is present at about 0.01% to about 10% or 0.1 g/L to about 100 g/L (col.2, lines 36-39).

As to claim 21, Wang et al teach that the abrasive particles are present in the composition of about 0.01% to about 15% by weight (col.2, lines 26-27).

As to claims 22-23, the oxidizing agent comprises potassium iodate (col.2, lines 40-41).

As to claims 24,26 and 27, Wang et al teach that the slurry is aqueous slurry (col.1, lines 62-65) and the abrasive particle comprises alumina or silica or ceria (col.2, lines 23-30).

As to claims 32-33, Wang et al teach that the polishing is performed to a metal/dielectric composite (col.1, lines 33-45) but fail to teach the etching ratio of metal relative to the dielectric.

As to claim 37, Wang et al teach that the metal substrate could comprises tungsten or copper or aluminum and dielectric is typically silicon dioxide in a metal/dielectric composite structure (col.1, lines 41-45 and col.4, lines 30-32).

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As to claim 38, Wang et al teach that the wafer carrier rotates about 50 rpm and the polishing table with pad rotates about 40 rpm (col.3, lines 23-25).

4. Claims 19-25, 28-31 and 34-36 are rejected under 35 U.S.C. 102(e) as being anticipated by Sakatani (5,804,513).

As to claim 19, Sakatani et al disclose a method for polishing metal using slurry including an abrasive composition comprising an oxidizing agent and abrasive particles (col.4, lines 3-9).

Sakatani et al disclose that the metal substrate is contacted with a polishing pad (col.7, lines 52-57).

Sakatani et al also disclose the pH of the composition is about 7 (col.3, lines 61-63).

Sakatani et al inherently teach that the property of the oxidizing agent such as the static etch rate on metal is less than 1000 Angstrom per hour because the oxidizing agent (iodates) used by Wang et al is exactly similar with the applicant's oxidizing agent.

As to claims 20-21, Sakatani et al disclose that oxidizing agent is preferably used in amount of about 0.5% by weight to about 15% by weight and the abrasive particle is about 5 to about 40% by weight (col.3, lines 42-45 and col.4, lines 12-15).

As to claims 22-23, Sakatani et al teach that the oxidizing agent comprises iodate that broadly includes potassium iodate (col.4, lines 7-9).

As to claim 25, the abrasive particles have a particle size of about 0.1 to about 1.5 micrometer or 100nm to about 1500nm (col.3, lines 39-41).

As to claims 28-31, Sakatani et al teach that organic solvent such as ethanol or methanol is used in the polishing slurry composition for preparing the abrasive suspension (col.4, lines 55-58).

As to claim 34, Sakatani et al teach that polishing of the metal layer is performed immediately preceding the deposition of a dielectric layer (2) (col.1, lines 57-col.2, lines 2).

As to claims 35-36, Sakatani et al teach that an adhesion-promoting layer such as titanium nitride is polished during the polishing process (col.2, lines 1-4).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Small et al (2002/0111024 A1) disclose a composition of polishing slurry for metal, wherein the static etch rate for copper shows less than 1000 angstrom per hour (see paragraphs 0160-0162) and Mravic et al (6,083,840) disclose a slurry composition, wherein static etch rate of copper is 11.3 nm/min. (col.9, lines 32-35).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (703) 305-1929. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on (703) 308-3836. The fax phone

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numbers for the organization where this application or proceeding is assigned are (703)-872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

SA
June 9, 2003

Shamim Ahmed
Examiner
Art Unit 1765



ROBERT KUNEMUND
PRIMARY EXAMINER